

Investigation of a *Clostridium difficile* Infection (CDI) Outbreak in a Community Teaching Hospital

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Background

- A 65.5% increase in HA CDI between Q4 2016 and Q1 2017 prompted a multi-disciplinary response team including senior administration, the CMO, infection prevention (IP), environmental services, the hospital epidemiologist (HE), laboratory, pharmacy, emergency department (ED), and nursing to address the problem
- Multi-disciplinary meetings began April-May 2017.
- Preventative measures already in place prior to the team meeting included:
 - Antimicrobial stewardship
 - Hand hygiene monitoring
 - Preemptive isolation of patients based on *C. diff* testing order
 - Cohorting of patients when private rooms unavailable
 - Terminal cleaning of CDI rooms

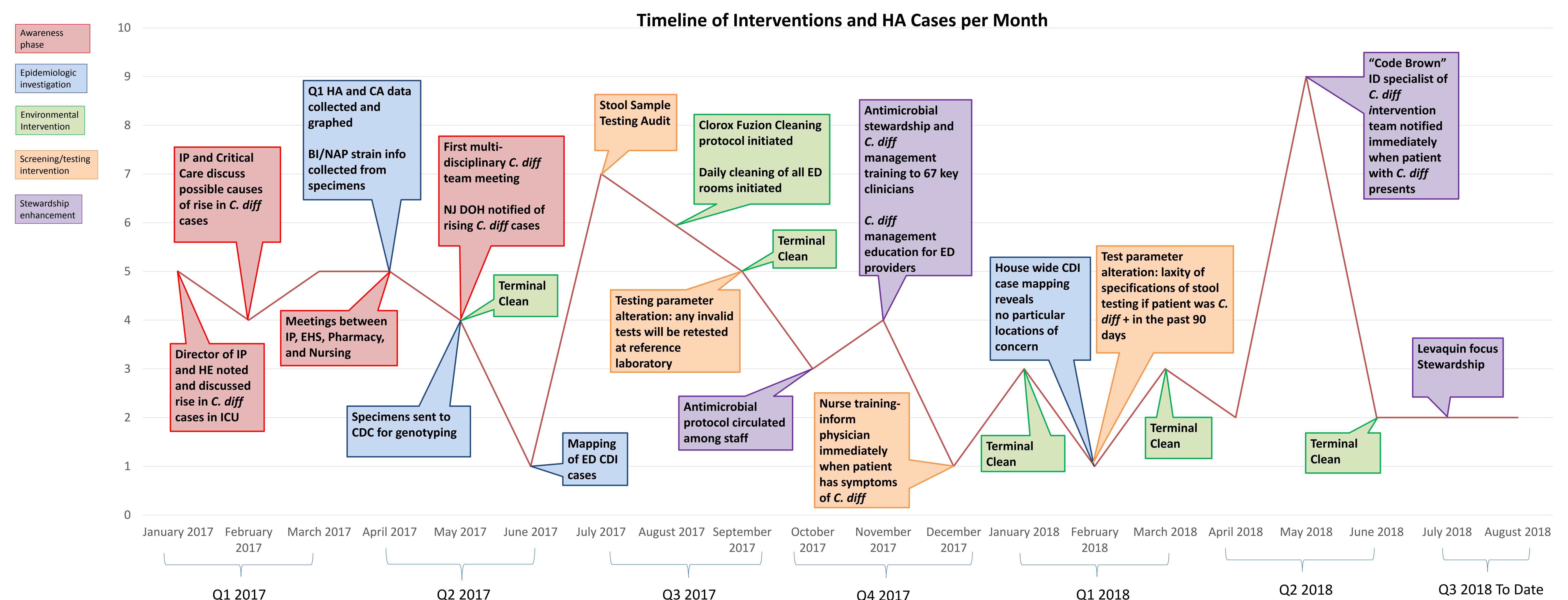
Methods

- Epidemiologic investigation included:
 - Identification and categorization of HA and CA CDI using NHSN/CDC guidelines¹:
 - CA CDI: patient identified ≤ 3 days after admission to the facility
 - HA CDI: patient identified >3 days after admission to the facility (specifically, on or after day 4)
 - Epidemic curve
 - ED and House Wide case mapping
 - Molecular typing of isolates was performed to determine if this was a single-strain outbreak
- Multi-disciplinary team-driven interventions:
 - Quarterly terminal cleaning of the ED once the ED was determined to be a possible site of contamination
 - Improved CDI screening and testing based on stool testing audits
 - Intensified antimicrobial stewardship (AS) with mandatory education for key clinicians
 - Rigorously enhanced enforcement of hand hygiene in the ED with secret observers and directed feedback
- Assessments:
 - Pre, mid, and fully-implemented intervention HA and CA CDI rates were observed
 - Hand hygiene rates in the ED and House Wide were measured
 - SIR per quarter was measured
 - Ongoing anti-microbial use

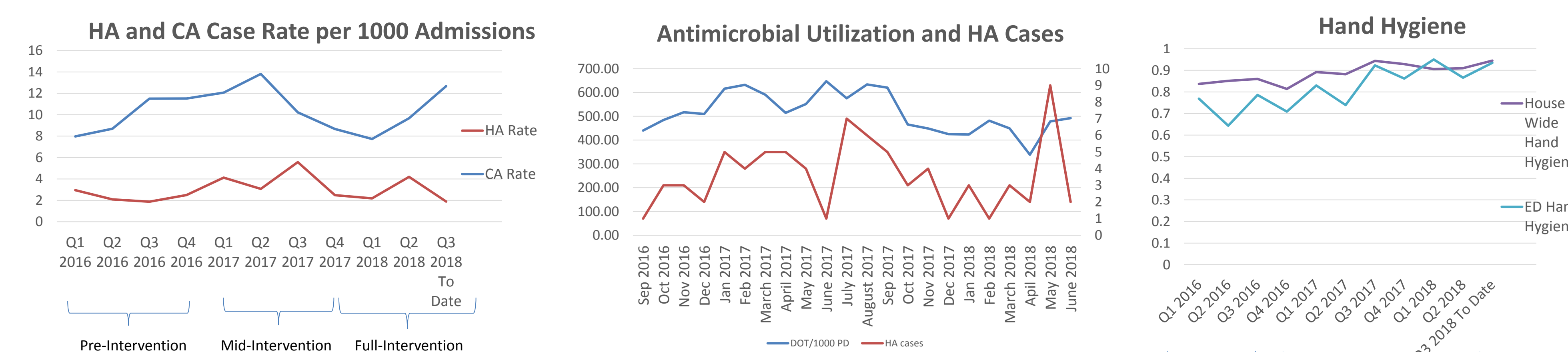
References

1. Multidrug-Resistant Organism & Clostridium difficile Infection (MDRO/CDI) Module Protocol. National Healthcare Safety Network, CDC. 2018.
 2. McDonald LC, Gerding DN, Johnson S, Bakken JS, Carroll KC, Coffin SE, et al. Clinical Practice Guidelines for Clostridium difficile Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA). Clin Infect Dis. 2018 Mar 19;66(7):e1-e48.

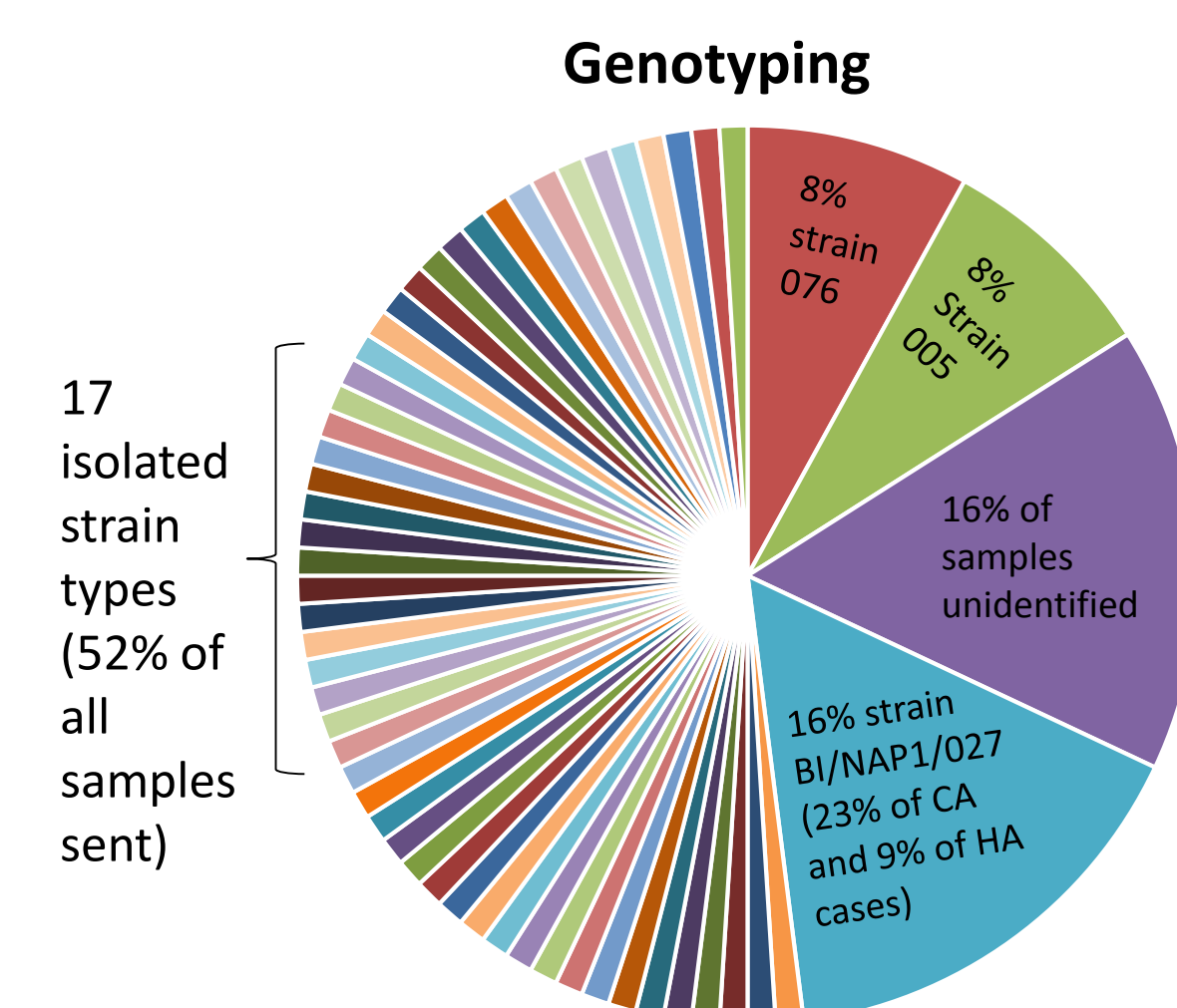
Figure 1



Results



- Antimicrobial stewardship before, during and after the outbreak – DOT/1000 patient days
- HA CDI rates after full-intervention in Q4 2017 and Q1 2018 trended toward baseline (2.1, 95% CI= 0-5.93) but had not achieved statistical improvement
- A significant correlation between HA CDI rates and CA CDI rates was not found, ($r=0.241$, $p<0.5$)



- 21 of 25 samples sent DOH/CDC were genotyped
- No single strain detected as cause of outbreak

Discussion

OUTBREAK OBSERVATIONS

- 95% of CA CDI and 98% of HA CDI were admitted through the ED
- It appears that following each terminal clean, HA CDI rates subsequently drop (see Figure 1), suggesting the ED as a source of contamination
- However, no linked cases were clearly identified via case mapping or molecular typing
- Case mapping of CDI cases house wide showed CDI distributed throughout the hospital
- Genotyping did not identify a single strain outbreak
- The rate of CA CDI appeared to drive the HA CDI at the onset of the outbreak but then diverged as the HA CDI outbreak was controlled
- A statistically significant increase in hand hygiene was noted
- Antimicrobial use did not vary greatly but appears to have trended lower as outbreak resolved
- No one specific intervention was clearly responsible for control of the outbreak, as is typical with a “bundled” CDI prevention²

CONCLUSIONS

- This outbreak and its management illustrate the importance of active surveillance and a rapid multi-discipline team-based response to CDI outbreaks
- Further study is needed to examine the relationship between HA CDI and ED terminal cleaning